

KISHINEVSKIY, V.B. (Moskva); GRIGOROVICH, V.K. (Moskva)

Heat-resistance of zirconium-niobium alloys. Izv. AN SSSR. Otd. tekhn.
nauk. Met. 1 topl. no. 5: 135-138 S-O '62. (MIRA 15:10)
(Zirconium-niobium alloys—Thermal properties)

"APPROVED FOR RELEASE: 09/17/2001

CIA-RDP86-00513R000722820007-3

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BERNSHTEYN, M.L.; KISHINEVSKIY, V.B.

Apparatus for ultraviolet microscopy; review of foreign literature.
Zab.lab.21 no.10:1256-1259 '55. (MIRA 9:1)

1.Obzor zarubezhnykh dannykh.
(Microscope)

KISHINEVSKIY, R.N.

Using a chemical composition for impregnating switch chambers.
Elek.i tepl.tiaga 3 no.6:16 Je '59. (MIRA 12:9)

1. Nachal'nik remontno-revizionnogo tsokha uchastka energosnab-
zheniya, Kalininskaya doroga.
(Electric railroads—Substations)
(Electric switchgear)

KISHINEVSKIY, R.M., inzh.

Assembly line building of steel floating docks. Sudostroenie 28
no.7:62-65 JI '62. (MIRA 15:8)
(Docks) (Assembly line methods)

NALETOV, N.; POGODIN, M.; GRIBANOVA, N.; KISHINEVSKIY, P.

We need help. Sov. profsoiuzy 16 no.22:43 N '60. (MIRA 14:1)

1. Zamestitel' predsedatelya Doma kul'tury, g.Bryansk (for Kishinevskiy).

(Bryansk—Amateur theatricals)

KISHINSKIY, M. I.

Handbook for skilled workers on round log transportation roads. Moskva, Goslestekhnizdat, 1944. 31 p.

KISHINSKIY, M. I.

36375 KISHINSKIY, M. I. I VOL'F. V. I.

Pogruzhatel' pritsopa na avtomobil: (Pogruzhatel' MFP-3) Izv. Front-St', 1949,
No. 11, S. 16-18

SO: Letopis' Zhurnal'nykh Statey, No. 49, 1949

KISHINSKIY, N. I.

Technology

Use and technical maintenance of the automobile ZIS-150 in the hauling of timber,
Moskva, Goslesbumizdat, 1951.

Monthly List of Russian Accessions, Library of Congress, December 1952. UNCLASSIFIED.

STRASHINSKIY, B.A.; KISHINSKIY, M.I., redaktor; SHMEL'KINA, S.I., tekhnicheskiiy redaktor

[Organizing the construction of logging roads] Organizatsiya
stroitel'stva lesovoznykh dorog. Moskva, Goslesbumizdat, 1952.
113 p. (Biblioteka lesosagotovitel'ia, no.42) [Microfilm]
(Forest roads) (MLRA 10:1)

1. BUVERT, V. V., Prof.; IONOV, B. D., Docent; KISHINSKIY, M. I., Docent;
SYROMYATNIKOV, S. A., Docent

2. USSR (600)

4. Lumbering

7. New textbook on land transport of timber ("Land transport of timber."
Prof. V. V. Buvert, Docent B. D. Ionov, Docent M. I. Kishinskiy, Docent
S. A. Syromyatnikov. Reviewed by M. A. Zav'yalov, G. T. Urtaev.)
Les. prom., 13, no. 4, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

KISHINSKIY, M.I.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

<u>Name</u>	<u>Title of Work</u>	<u>Nominated by</u>
Buvert, V.V.	"Land Transport of Lumber"	Moscow Forestry Engineering
Ionov, B.D.	(textbook)	Institute
<u>Kishinskiy, M.I.</u>		

SO: W-30604, 7 July 1954

KISHINSKIY, Mikhail Il'ich; BUVERT, V.V., redaktor; KARASIK, N.P.,
tekhnicheskii redaktor.

[Using and repairing logging roads] Eksploataatsiia i remont
lesovoznykh dorog. Moskva, Goslesbumizdat. Vol. 1 [Dirt,
gravel, log and snow-and ice roads] Gruntovye, graviinye,
leshnevye i sneshnolediane dorogi. 1954. 326 p. (MLRA 8:8)
(Roads)

KISHINSKIY M. I.

AUTHOR: *p. 2* None Given

SOV-118-58-7-7/20

TITLE: A Scientific-Technical Conference on Questions Regarding the Mechanization of the Lumber Industry (Nauchno-tekhnicheskaya konferentsiya po voprosam mekhanizatsii v lesnoy promyshlennosti)

PERIODICAL: Mekhanizatsiya trudoyemkikh i tyazhelykh rabot, 1958, Nr 7, p 19, (USSR)

ABSTRACT: In May 1958, the Moskovskiy lesotekhnicheskii institut (the Moscow Institute of Forest Engineering) called a scientific conference. Attending were approximately 300 persons, among them representatives from the Gor'kovskiy (Gor'kiy), Kalininskiy (Kalinin), Kirovskiy (Kirov), Komi, Permskiy (Perm'), Tyumenskiy (Tyumen') and Moskovskiy (Moscow) sovnarkhozes. Also attending were delegates from big lumber enterprises, lumber mills, furniture factories; the Gosudarstvennyy nauchno-tekhnicheskii komitet Soveta Ministrov SSSR (State Scientific Technical Committee of the USSR Council of Ministers), the USSR Gosplan, the TsNIIME, the TsNIIMOD, the Giprolesprom and from other organizations. The Member-Correspondent of the VASKhNIL, N.P. Anuchin reported on the future development of the Soviet lumber industry (1959 to 1965). The Chief Engineer of the Krestetskiy-lespromkhoz TsNIIME (the Kresttsy Lespromkhoz) reported on a semi-automatic conveyor line introduced at

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the Krestitsy lespromkhoz. The Candidate of Technical Sciences, B.A. Tauber delivered a report on the mechanization of lumber loading and stacking operations. The following reports were also heard: Dotsent N.I. Suboch - "The Present State and Development **Methods of Traction Machinery in** Lumber Transportation"; Dotsent M.I. Saltykov - "The All-Round Utilization of Raw Material and the Organization of Lumber Industry on the Principle of Continuous Forest Use"; Candidate of Technical Sciences, G.A. Vil'ke - "The Vibration of Gasoline Motor Saws"; scientific worker, V.V. Kharitonov - "Choosing a Method of Bark Stripping"; Dotsent M.I. Kishinskiy - "The Transportation of Lumber by Motor Transport in Winter"; Professor M.I. Zaychik - "The Exploitation of Diesel Engines at Shops"; Professor N.N. Chulitskiy - "Investigations on New Technological Equipment for Production Line and Automated Furniture Production"; Head of the Tekhnologicheskiiy otdel proyektного instituta Nr 2 (Technological Division of the Nr 2 Design Institute), V.A.

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SOV-118-58-7-7/27

A Scientific-Technical Conference on Questions Regarding the Mechanization
of the Lumber Industry

Tselebrovskiy - "Mechanization and Automation of Production Pro-
cesses at the Raw Material Exchange Center of the Omutninsk
House Construction Combine".

1. Lumber industry--USSR

Card 3/3

SEROV, Aleksandr Vladimirovich, dotsent; SANYUKOVICH, Nikolay Andreyevich, starshiy prepodavatel'; BYTSKO, Vladimir Aleksandrovich, assistant; VOLGIN, Vitaliy Pavlovich, assistant; NIKIFOROV, Vasilii Maksimovich, kand.tekhn.nauk; VOZNESENSKIY, N.P., prof., doktor tekhn.nauk, retsentsent; KISHINSKIY, M.I., red.; PITERMAN, Ye.L., red. izd-va; KARASIK, N.P., tekhn.red.

[Use of machinery in logging camps] Eksploatatsia mashin v lesozagotovitel'nykh predpriyatiyakh. Moskva, Goslesbumizdat, 1959. 280 p. (MIRA 13:3)

1. Kafedra "Tyagovyye mashiny" Moskovskogo lesotekhnicheskogo instituta (for Serov, Sanyukovich, Bytsko, Volgin, Nikiforov). (Logging--Machinery)

M-7 10

25(1), 28(1), 32(2)

SOV/118-59-9-9/20

AUTHORS: Radkovskiy N.A., Engineer, and Ivanov M.I. and
Kishinskiy M.I., Candidates of Technical Sciences

TITLE: Mechanization of Snow-Ice Road Building

PERIODICAL: Mekhanizatsiya i avtomatizatsiya proizvodstva, 1959,
Nr. 9, pp 37-41 (USSR)

ABSTRACT: Most of the timber cutting regions are notable for their snowy winters when snow lies over 5-6 months in a year, 50-60 cm high. On the other hand, the vast boggy areas often encountered in these regions hinder and sometimes make it altogether impossible to transport timber during the summer time. Under these circumstances, the advantages of winter transport become evident; hence the importance of winter road building mechanization. All the outfits for snow-road building applied in the Soviet Union until now (wooden rollers, squares, track cleaners, etc.) were primitive, hand-made devices which did not ensure an adequate functioning of winter roads and required much manual labor for their maintenance. Finally two designs ensuring a high efficiency

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Mechanization of Snow-Ice Road Building

degree and diminishing the volume of labor required for the building and maintenance of winter roads have been worked out and put into operation. One of these devices is an automotive vacuum sprinkler, designed by V.G. Shtarker, another is an assembly for maintaining the road in proper condition, designed by E.Ya.Vitkovskiy. The vacuum sprinkler is a heated, 4 m³ capacity tank mounted on the automobile ZIL-150 (Fig. 1). At switching to "vacuum", the automobile motor begins to suck the air from the tank, and water from a reservoir enters through a hose into the tank. When the tank is filled, an electric switch connected with a floating device, automatically switches the motor back to "atmosphere" and stops the water entering the tank. The water inlet and outlet attachments, as well as the hose, are heated by exhaust gases; even during the strongest frosts they never freeze and operate faultlessly. The inside of the tank is also heated; as a result, the water temperature never drops below 10° - 14° C. To let the water out, the dri-

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ver opens the water outlet by means of a special lever placed in his cabin. Water comes out on a tray and is distributed along the entire width of the stretch which must be covered with ice. The water lifting height is 3 to 5 m, which is sufficient for taking it from natural sources. At the Bortomskaya single-track ice road in the Komi ASSR, efficiency of such a sprinkler was 64 m³ a day. The assembly for road maintenance is shown in Fig. 2. It comprises, on the whole, a scraper, a wire brush and a fan which consecutively clean the track. Simultaneously with the cleaning, the assembly does road levelling by removing the surplus snow from the track. Application of such an assembly in the Arkhangel'skaya oblast' has permitted keeping a road in good condition without using any trackmen, while formerly it was required to keep a worker for every 1-2 km of the road. To decrease labor expenditure and the cost of building and maintenance of winter roads, they are built by means of snow compacting; particularly it applies to such roads where the traffic is limited. In order to intensify the process of compacting, a special assembly was designed (Fig. 3). It consists of three units: a device in the

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Mechanization of Snow-Ice Road Building

form of a quickly rotating cutter for loosening the snow, an attachment for heating the snow, and a vibration compacting outfit. The cutter is round in shape, 80 cm in diameter; its peripheral rotation speed varies from 15 to 25 m/sec. The heat energy is introduced into the snow, by burning a liquid oil through the nozzles placed in the upper part of the heat chamber. The compacting device consists of a plate 70 cm long; lifting angle of its front part is 15° - 20° ; kinetic moment of vibrator imbalance varies from 2 to 25 kg/cm; vibration frequency is 4000 oscillations a minute. The assembly is mounted on runners and can be trailed by tractor DT-55 or S-80. 1.5 to 2 km of track 2.2 m wide can be compacted within an hour. There are 3 tables and 3 diagrams.

Card 4/4

BUVERT, Viktor Vladimirovich, prof.; IONOV, Boris Dmitriyevich, dotsent, kand.tekhn.nauk; ~~KISHINSKIY, Mikhail Il'ich~~, dotsent, kand.tekhn.nauk; SYROMYATNIKOV, Sergey Arkad'yevich, dotsent, kand.tekhn.nauk; KORUNOV, M.M., prof., retsenzent; VERIGO, M.F., prof., doktor tekhn.nauk, red.; POLTEVA, B.Kh., red.izd-va; BACHURIHA, A.M., tekhn.red.

[Land transportation of timber] Sukhoputnyi transport less.
Izd.2., perer. Pod obshchey red. M.F.Verigo. Moskva, Gosles-
bumizdat. Vol.1. 1960. 475 p. (MIRA 14:4)
(Lumber--Transportation)

DARAGAN, Leonid Dmitriyevich; LAKHNO, Rostislav Pavlovich; KISHINSKIY, M.I.,
kand. tekhn. nauk, red.; TIKHONOVA, N.V., red. izd-va; KORYUSHINA,
A.S., tekhn. red.

[Handbook for the lumber truck road expert] Spravochnik mastera
lesovoznoi avtomobil'noi dorogi. Pod red. M.I.Kishinskogo. Mo-
skva, Goslesbumizdat, 1961. 153 p. (MIRA 14:5)
(Forest roads)

VORONITSYN, K.I., kand. tekhn. nauk, red.; TIZENGAUZEN, P.E., kand. tekhn. nauk, red.; NADBAKH, M.P., red.; TANTSEV, A.A., starshiy nauchnyy sotr., red.; ABRAMOV, S.A., kand. tekhn. nauk, red.; ABRAMOV, D.A., red.; BOGDANOV, N.I., starshiy nauchnyy sotr., red.; VINOGROROV, G.K., kand. tekhn. nauk, red.; GAVRILOV, I.I., starshiy nauchnyy sotr., red.; GUSARCHUK, D.M., starshiy nauchnyy sotr., red.; D'YAKONOV, A.I., red.; ZAV'YALOV, M.A., kand. tekhn. nauk, red.; ZARETSKIY, M.S., starshiy nauchnyy sotr., red.; KACHELKIN, L.I., starshiy nauchnyy sotr., red.; KISHINSKIY, M.I., kand. tekhn. nauk, red.; KOLTUNOV, B.Ya., starshiy nauchnyy sotr., red.; OSIPOV, A.I., kand. tekhn. nauk, red.; SHINEV, I.S., kand. ekon. nauk, red.

[Materials of the enlarged session of the Scientific Council of the Central Scientific Research Institute for Mechanization and Power Engineering in Lumbering on problems concerning power engineering and the electrification of the lumber industry]
Materialy rasshirennoi sessii Uchenogo soveta TsNIIME po voprosu energetiki i elektrifikatsii lesnoi promyshlennosti. Moskva, 1961. 75 p. (MIRA 15:4)

(Continued on next card)

VORONITSYN, K.I.---(continued) Card 2.

1. Khimki. Tsentral'nyy nauchno-issledovatel'skiy institut mekhanizatsii i energetiki lesnoy promyshlennosti. 2. Nachal'nik Tsentral'nogo byuro tekhnicheskoy informatsii lesnoy promyshlennosti (for Nadbakh). 3. Direktor Tsentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Voronitsyn). 4. Uchenyy sovet Tsentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for D'yakonov). 5. Nachal'nik otdeleniya energetiki i sredstv avtomatizatsii Tsentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Zaretskiy).

(Lumbering)

(Electric power)

MEL'NIKOV, Valentin Ivanovich, dots., kand. tekhn. nauk; SERGEYEV, Petr Georgiyevich, dots., kand. tekhn. nauk; DMITRIYEV, Yuriy Yakovlevich, kand. tekhn. nauk; SELIN, M.F., retsenzent; DOIL'NITSINA, A.G., retsenzent; IONOV, B.D., retsenzent; KISHINSKIY, M.I., otv. red.; PLESKO, Ye.P., red. izd-va; GRECHISHCHEVA, V.I., tekhn. red.

[Land transportation of timber and lumber floating] Sukhoputnyi lesotransport i lesosplav. Moskva, Goslesbumizdat, 1962. 314 p. (MIRA 15:12)

1. Petrozavodskiy lesotekhnicheskii tekhnikum (for Ionov). (Lumber—Transportation)

KISHINSKIY, Mikhail Il'ich, kand. tekhn. nauk, dots.; YEPIFANOV,
Boris Yefimovich, kand. tekhn. nauk, dots.; SMIRENNIKOV,
Pavel Stepanovich, inzh.; STRASHINSKIY, B.A., inzh.,
retsenzent; NOVIKOV, G.G., prepodavatel', retsenzent;
GAVRILOV, I.I., red.

[Use and repair of logging roads] Eksploatatsiya i remont
lesovoznykh dorog. Izd.2., perer. Moskva, Izd-vo "Lesnaya
promyshlennost'," 1964. 40. p. (MIRA 17:7)

1. Alatyrskiy lesotekhnicheskii tekhnikum (for Novikov).

KISHINSKIY, S. A.

KISHINSKIY, S. A.

Moskva, Goslesbumizdat, 1951.
818 p. illus., diagrs., tables.
"Literatura" at end of chapters.

N/5
729.4
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KISHINSKIY, V.V.

Basic measures securing the completion of the plan of topographic
and geodetic work in 1961. Geod. i kart. no.1:3-8 Ja '61.

(MIRA 14:9)

(Surveying)

USSR/Human and Animal Physiology - Blood Circulation.

V-5

Abs Jour : Ref Zhur - Biol., No 1, 1958, 3984

Author : A.A. Kishisheva

Inst : -

Title : Pulmonary Hypertension in Cases of Non-Closure of the Arterial Duct.

Orig Pub : Khirurgiya, 1957, No 4, 21-31

Abstract : No abstract.

Card 1/1

PAVEL, I.; KYMPYANU, S.; KISHIU, N.

Electrophoretic examination of blood serum proteins in experimental deficiency of vitamins A, B, C and D, and biotin. Vop.pit. 20 no.2:47-50 Mr-Apr '61.
(MIRA 14:6)

1. Iz kliniki pitaniya i diyetetiki pri bol'nitse imeni doktora Kantakuzena, Bukharest, Rumyniya.
(DEFICIENCY DISEASES) (BLOOD PROTEINS)

KISHKAR', P.M., veterinarnyy vrach.

Book with considerable shortcomings ("Compound method of controlling parasitic diseases in domestic animals." R.S.Chebotarev). Reviewed by P.M.Kishkar'. Veterinariia 32 no.7:90-91 J1 '55. (MIRA 8:9) (CHEBOTAREV, R.S.) (PARASITES--DOMESTIC ANIMALS)

NOVOSELOV, S.S.; VARTANYAN, A.M.; KISHKAREV, V.A.; AVERCHENKOV, D.O.;
SIDOROVSKIY, V.A.

Pilot plant testing methods of removing copper from ~~crude~~ lead
with transfer of the ~~copper~~ into matte. TSvet. met. 35 no.5:
25-31 My '62. (MIRA 16:5)
(Lead—Metallurgy) (Copper—Metallurgy)

KISHKIN, B. P.

KISHKIN, B. P.: "The concentration of stress in plane deformation, and breakdown when grinding with deep cuts." Moscow State University M. V. Lomonosov. Moscow, 1956.
(Dissertation for the Degree of Candidate in Physicomathematical in Sciences).

SO: Knishaya letopis', No 23, 1956

KISHKIN, B.P.

Concentration of stresses during plane deformation and destruction
of a beam with deep notches. Vest. Mosk. un. Ser. mat. mekh. astron.,
fiz., khim. 12 no. 6:17-23 '57. (MIRA 11:10)

1. Kafedra teorii i ispytaniy Moskovskogo gosudarstvennogo universiteta.
(Girders--Testing)

S/055/63/000/001/005/008
D251/D308

AUTHORS: Kishkin, B. P. and Noskova, I. G.

TITLE: On the strength of glass-cloth laminate after heat-treatment.

PERIODICAL: Moscow. Universitet. Vestnik. Seriya I. Matematika, Mekhanika, (no. 1, 1963, 46-47

TEXT: A sheet of glass-cloth laminate KACT-B (KAST-V) was tested, using specimens of size 200 x 30 x 6 mm. The specimens were heated to the required temperature (controlled automatically with precision $\pm 2^{\circ}\text{C}$), and allowed to cool for 24 hours. The temperatures attained varied from 85° to 180°C . Results showed that the thermal working increased the values of the breaking load and the strength limit and that these new values did not change in the course of three months. The optimum values were obtained with heating to 140°C . There are 1 figure and 1 table.

Card 1/2

On the strength of ...

S/055/63/000/001/005/008
D251/D308

ASSOCIATION: Kafedra teorii uprogosti (Department of the Theory
of Elasticity)

SUBMITTED: January 6, 1962

Card 2/2

KISHKIN, D.

Endemic goiter in the village Samoranovo, Stanke-Dimitrov region.
Suvrem.med., Sofia no. 6:30-38 '59.

1. Iz Obedinenata gradska bolnitsa - gr. Stanke Dimitrov. Gl.lekar:
B. Isakov.

(GOITER statist.)

KISHKIN, D.

Effect of age and sex factors on the development of endemic goiter.
Suvrem med., Sofia no.4/5:121-132 '61.

1. Iz Gradskata bolnitsa v gr. St. Dimitrov (Glaven lekar B. Isakov.)

(GOITER statist) (AGING) (SEX)

KISHKIN, D.

Results of supplementing iodine therapy with a Bulgarian preparation
Antistrumin in students. Suvrem med., Sofia no.4/5:133-137 '61.

1. Iz Gradskata bolnitsa v St. Dimitrovo (Glav. lekar B. Isakov.)

(GOITER prev & control) (IODINE ther)

1ST AND 2ND OBSERVATIONS		3RD AND 4TH OBSERVATIONS		5TH AND 6TH OBSERVATIONS		7TH AND 8TH OBSERVATIONS		9TH AND 10TH OBSERVATIONS		11TH AND 12TH OBSERVATIONS		13TH AND 14TH OBSERVATIONS		15TH AND 16TH OBSERVATIONS		17TH AND 18TH OBSERVATIONS		19TH AND 20TH OBSERVATIONS		21ST AND 22ND OBSERVATIONS		23RD AND 24TH OBSERVATIONS		25TH AND 26TH OBSERVATIONS		27TH AND 28TH OBSERVATIONS		29TH AND 30TH OBSERVATIONS		31ST AND 32ND OBSERVATIONS		33RD AND 34TH OBSERVATIONS		35TH AND 36TH OBSERVATIONS		37TH AND 38TH OBSERVATIONS		39TH AND 40TH OBSERVATIONS		41ST AND 42ND OBSERVATIONS		43RD AND 44TH OBSERVATIONS		45TH AND 46TH OBSERVATIONS		47TH AND 48TH OBSERVATIONS		49TH AND 50TH OBSERVATIONS		51ST AND 52ND OBSERVATIONS		53RD AND 54TH OBSERVATIONS		55TH AND 56TH OBSERVATIONS		57TH AND 58TH OBSERVATIONS		59TH AND 60TH OBSERVATIONS		61ST AND 62ND OBSERVATIONS		63RD AND 64TH OBSERVATIONS		65TH AND 66TH OBSERVATIONS		67TH AND 68TH OBSERVATIONS		69TH AND 70TH OBSERVATIONS		71ST AND 72ND OBSERVATIONS		73RD AND 74TH OBSERVATIONS		75TH AND 76TH OBSERVATIONS		77TH AND 78TH OBSERVATIONS		79TH AND 80TH OBSERVATIONS		81ST AND 82ND OBSERVATIONS		83RD AND 84TH OBSERVATIONS		85TH AND 86TH OBSERVATIONS		87TH AND 88TH OBSERVATIONS		89TH AND 90TH OBSERVATIONS		91ST AND 92ND OBSERVATIONS		93RD AND 94TH OBSERVATIONS		95TH AND 96TH OBSERVATIONS		97TH AND 98TH OBSERVATIONS		99TH AND 100TH OBSERVATIONS	
<p><i>ca</i></p> <p><i>1. The theory of the temper brittleness of special steel.</i> <i>S. T. Kishkin. Bull. acad. sci. U. R. S. S. Classe sci. tech. 1941, No. 3, 101-6.</i>—After a prolonged tempering at 650° the hard soln. is enriched in C by soln. of cementite. This residual C can sep. either partly or in considerable amts. even on slow cooling at 650° in steels in which this temp. is sufficient for homogenization by diffusion of C. Addnl. prolonged tempering at 800-850° decreases the concn. of C by sepn. from the solid soln. and by the formation of very fine nonferrous carbides, which solve on a 2nd heating to 650°. At 650° they coagulate, overcoming brittleness. Increase of the impact strength after a prolonged tempering at 650° (if it is preceded by a 3-fold tempering at 650° with slow cooling) agrees well with the conception of the irreversibility of the reaction of the formation of nonferrous carbides during the tempering process. Thermal treatments of steel containing carbide-forming elements confirmed the contention that a manifold "high tempering" at 650-750° with a slow cooling facilitates a max. sepn. of C from the solid a-soln. An addnl. prolonged tempering in the "brittleness zone" facilitates the coagulation of carbides without the formation of new fine particles, increasing the impact strength. The amt. of a special element (such as Cr) bound to carbides increases constantly with the increase of the temp. of the tempering to the Ac₁ point, and the nonferrous carbides become larger and larger. The appearance of new minute carbides of the special elements during a slow cooling after tempering at 650° takes place at the expense of C which had become "free" by soln. of Fe carbides or of complex carbides of Fe and Mn, but not by soln. of the nonferrous elements produce no steel brittleness if ordinary amts. of P and other admixts. are present. The effect of these admixts. is only secondary and becomes apparent only when their content is high. Seventeen references.</p> <p style="text-align: right;">W. R. Henn</p>																																																																																																			
<p>ASB-51A METALLURGICAL LITERATURE CLASSIFICATION</p>																																																																																																			

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The mechanism of the effect of molybdenum and columbium on the temper-brittleness of steels. S. T. Kishkin. *Bull. acad. sci. U. R. S. S., Classe sci. tech.* 1941, No. 4, 91-4. —Cb, like Mo, decreases the temper-brittleness of special steels. The carbides of Cb and Mo are dissolved back into the solid soln. only at very high temps. (1200-1300°). During hardening steel from normal temps. the carbides of Cb and Mo (which absorbed some C) exist in the metal in that form in which they were present before hardening, i.e., as relatively coarse particles. These carbide particles serve as centers of crystn. of the coarse carbide masses during tempering of steel and prevent the appearance of new fine carbides which are the cause of the temper-brittleness. The presence in γ -Fe of Cb and Mo carbides decreases the degree of supersatn. of the solid soln. with C after hardening and retards the sepn. of the fine special carbides (Cr, Mn, etc.). The effect of Mn in processes causing temper-brittleness is connected not with its presence in the solid soln. of α -Fe, but with the property of forming slightly sol. carbides. Hardening from 1300° and tempering at 300-50° for 2 hrs. does not decrease the impact resistance or decreases it (owing to overheating) very little, as compared with hardening from normal temps. with the same tempering. The slight decrease of the impact resistance observed in some cases (after hardening from 1300° and a low tempering) is the smaller the more Cb is present in the steel. Cb decreases the tendency of steel to overheat. Ni steel contg. no special carbide-forming elements has no tendency for temper-brittleness when hardened from either 920 or 1250°. Ni and Si-Ni steels contg. Mo or Cb are insensitive to temper-brittleness only when hardened from comparatively low temps. at which the carbides of Mo and

9
Cb cannot dissolve in the solid soln. of γ -Fe. Ni and Si-Ni steels contg. Mo or Cb possess temper-brittleness if the hardening temp. is sufficiently high for the carbides of Mo or Cb to dissolve in the solid soln. The absence of brittleness in Ni-Mo and Ni-Cb steels when tempering from 920° and the presence of brittleness after hardening at 1250-1300° indicate that the carbides of Mo and Cb are not dissolved below the point A₆ and are not dissolved even at 920°. Ti, like Mo and Cb, also decreases the sensitivity of steel to temper-brittleness. The results of the expts. confirm the proposed theory of the sepn. and coagulation of nonferrous carbides on the basis of which lie the irreversible processes of the formation of the carbide particles of special elements during tempering of steel below the critical point A₆.
W. R. Henn

Evaluation B-59660

U-1530, 25 Oct 51

Effect of Si on properties of constructional steel. S. T. Kishkin. Bull. Acad. Sci. U.R.S.S., Class. sci. tech. 1943, No. 5/6, 78-83.—Steels contg. C 0.31-0.36, Mn 0.61-0.64, Cr 2.13-2.19, and Si 0.27-3.07% were used. Hardness increases with percentage of Si whatever the annealing temp.; impact strength increases with rise in Si content after annealing at 200-400°, and decreases with rise in Si content after annealing at 450-600°. This is due probably to an effect of Si on the Cr carbides; at lower temp. Si retards, and at higher temp. accelerates, their formation. The amt. of Fe carbides is reduced by Si at all annealing temps.; it has a max. at 750°.

H. C. P. A.

KISHKIN, S. T.

PA 14743

USSR/Steel - Hardness
Martensite

Dec 1946

"The Nature of the Hardening of Steel and High
Hardness of Martensite," S. T. Kishkin, 10 pp

"Izv Ak Nauk Otd Tekh" No 12, 1949 *Jul*

Discusses various methods of hardening steel.
Concludes that the high hardness of martensite may
solve the problem of strengthening steel to
overcome cold distortion.

14743

KISHKIN, S. T.

USSR/Metals

Nov 1947

Charges, Electrostatic
Alloys - Properties

"Nature of Sensitivity to Concentrations of Charges by Highly Tensile Alloys,"

S. Z. Bokshtein, S. T. Kishkin, 3 $\frac{1}{4}$ pp

SSSR.

"Dokl. Ak. Nauk" Vol LVIII, No 4

Extreme sensitivity of highly tensile alloys to concentrations of charges has for many years prevented use of such alloys in industries. It appeared that highly stable materials could in no way be adapted to use in machinery. Author explains this phenomenon, which is particularly noticeable in open-hearth steel, and discusses results of experiments. Submitted by Academician A. A. Bochvar, 17 May 1947.

PA 38T85

KISHKIN, S. T.

USSR/Metals

Martensite
Steel Alloys

Jan 1948

"Measure of the Hardness and the Hardening of Metals and Alloys," S. T. Kishkin, R. L. Petrusovich, Inst Metal Izvuzi A. A. Baykov, Acad Sci USSR, All-Union Sci Res Inst Aviation Materials, 10 pp

"Izv Akad Nauk SSSR, Otdel Tekh Nauk" No 1

Discusses experiments conducted to show that hardening of martensite under pressure is only rare consequence of strengthening of superaturated hard steels and it usually disintegrates under influence of plastic deformation. Such approach to problem permits

4276

USSR/Metals (Contd)

Jan 1948

new method to study aging of light alloys. Submitted by Academician A. A. Bochvar at Institute of Metallurgy, May 1947. Published, 14 Jul 1947.

4276

KISHKIN, S. I.

Kishkin, S. I., "Carbide theory of Strengthening Steel." Symposium, "Increasing the Strength of Machine Parts," Institute of Machine Studies, Academy of Sciences USSR, and All-Union Scientific Engineering-Technical Society of Machine Building (VNITOMASH), 1949.

KISHKIN, S.T.

RT-909 (Against formalism in the theory of plastidity) Protiv formalizma v teorii plastichnosti.

IZVESTIYA AKADEMII NAUK SSSR; OTDELENIE TEKHNIICHESKIH NAUK, (2): 266-278, 1950.

1.

M. A.

Experimental Check of the Fundamental Law of the Plasticity Theory.
S. T. Kishkin and S. I. Ratner (Zhur. Tekhn. Fizika, 1949, 19, (3), 412-420; Appl. Mechanics Rev., 1950, 3, 77).--(In Russian). The object of the tests was to establish the relation between the yield stresses in shear (τ_y) and in tension (σ_y) for various materials. τ_y was defined as the shear stress at which the permanent set is 0.3% (which corresponds to 0.2% permanent set in tension) and was determined graphically. The ordinates of the stress-strain diagram were calculated according to the Nadai-Ludwig formula $\tau = (2\pi r^3)^{-1/2} (M - \frac{1}{2} \frac{dM}{d\theta})$ (The second term in the parentheses taking account of the strengthening effect of plastic deformation). The yield stress in tension σ_y was defined as the stress at which the permanent set is 0.2%. The ratio τ_y/σ_y , which according to Saint Venant has a value of 0.5, and according to the theory of Huber-Mises a value of 0.577, was found to vary from 0.25 for magnesium alloys to 0.74 for high-quality heat-treated steel. For pure metals with cubic crystal lattice (copper, iron, and aluminium) the ratio τ_y/σ_y is 0.48-0.49. For pure metals with hexagonal lattice the

ratio is very low, being 0.27 for pure magnesium. Annealed steel gives a value 0.5, whereas heat-treated steel can have a value as high as 0.7-0.8. The mean value for aluminium alloys is 0.4, but some cast aluminium alloys give 0.67. K. and R. have also determined the value of the field stress in torsion from the conventional formula $\tau_y = 16M/\pi d^3$, which was found to be 20-30% higher than the correct value calculated from the Madi-Ludwig formula.

FD-1041

USSR/ Metallurgy - Strength of metals

Card 1/1 : Pub. 153 - 12/23

Authors : Kishkin, S. T. Nikolenko, V. V., and Ratner, S. I.

Title : Strength of metals in contact with melted solder

Periodical : Zhur. tekhn. fiz., 24, 1455-1466, Aug 1954

Abstract : Conclude that brittle fracture of steel under the influence of melted solder occurs in the presence of definite elastic elongation, and that the tensile stress necessary for this depends upon the composition of the solder and also upon the duration of contact of the stressed steel with the solder and upon the composition of the steel itself. Observe that deposition of solder on non-stressed steel does not lower its resistance to fracturing. Four references, one USSR (Ya. M. Potak and O. I. Magazanik, Termicheskaya obrabotka i svoystva staley dlya samoletostroyeniya (Heat treatment and properties of steels for air-craft construction), Defense Press, No. 154, 1952).

Institution : - -

Submitted : 16 December 1953

KISHKIN, S. I.

The Mechanism of Weakening and Fracture of Crystalline Bodies with Time at High Temperatures. S. I. Kishkin (Doklady Akad. Nauk S.S.S.R., 1954, 93, (4), 760-761). (in Russian). Differences in behaviour of various metals and alloys subjected to const. tension at high temp are discussed. All cases of breaking can be represented by a similar curve of the strain/time diagrams, but static failure under load at high temp. occurs as a result of the development and propagation of intergranular cracks, in contrast with brittle failure at room temp., and fatigue failure at all temp., where the cracks appear inside the grains. The real difference between these types of failure lies in the fact that in the first case the cracks appear after only 10-20% and in the second case after 80-85% of the total time required for fracture. In this connection the problem of increasing the strength of the grain boundaries of high-temp.-resistant alloys is of great importance.

-S. K. L.

Evaluation B-80678, 22 Nov 54

KISHKIN, S.T.; BOKSHTZYN, S.Z.

[Investigating the distribution and diffusion of components in metal alloys by the method of autoradiography] Issledovanie raspredeleniia i diffuzii komponentov v metallicheskih splavakh metodom avtoradiografii. Moskva, 1955. 20 p.

(MIRA 12:11)

(Alloys--Metallography)
(X rays--Industrial applications)

KISHKIN, S. T.

14305 Distribution and Diffusion of Components in Metal Alloys Studied by the Autoradiographic Method. S. T. Kishkin and S. Z. Bokstein. *International Conference on the Peaceful Uses of Atomic Energy*, A/CONF.8/P/703, July 1955, 29 p. (QC770:In8a)

MC
① (Translated from the Russian.) Autoradiographic techniques permit direct and local study of structure and properties of real bodies, furnish qualitative and quantitative picture of distribution mode of elements in alloy, assist in quantitative solution of the diffusion problem along grain boundaries and within the crystal, and serve as a means of understanding mechanism of influence of minor impurities. Table, graphs, micrographs, photographs, diagrams. 18 ref.

of gw

Kishkin, S.T.

POTAK, Yakov Mikhaylovich; KISHKIN, S.T., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, Petsensent; FRIDMAN, Ya.B., laureat Stalinskoy premii, doktor tekhnicheskikh nauk, professor, retsensent; ZILOVA, T.K., kandidat tekhnicheskikh nauk, redaktor; SUVOROVA, I.A., redaktor; ZUDAKIN, I.M., tekhnicheskii redaktor.

[Brittle fracture of steel and steel parts] Khrupkie razrusheniia stali i stal'nykh detaliei. Moskva, Gos.izd-vo obor.promysh., 1955.
388 p. (Steel--Brittleness) (MIRA 9:4)

KISHKIN, S. T.

UMANSKIY, Yakob Semenovich; FINKEL'SHTEYN, Boris Nikolayevich; BLANTER
Mikhail Yevseyevich; KISHKIN, Sergey Timofeyevich; FASTOV, Niko-
lay Semenovich; GORELIK, Semen Samuilovich; STARODUBTSEVA, S.N.,
redaktor; ATTOPOVICH, M.K., tekhnicheskii redaktor.

[Physical principles in the study of metals] Fizicheskie osnovy
metallovedeniia. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po
chernoi i tsvetnoi metallurgii, 1955. 721 p. (MLRA 8:8)
(Metals)

Translation 563703

KISHKIN, S.T.
 Category : USSR/Solid State Physics - Phase transformation of solid bodies E-5
 Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1226
 Author : Bakshteyn, S.Z., Kishkin, S.T., Platonova, A.F., Popova, N.M.
 Title : Carbide Formation in Tempering of Chrome-Nickel Steels and Chrome-Nickel-Tungsten Steels
 Orig Pub : Fiz. metallov i metallovedeniye, 1955, 1, No 3, 459-466

Abstract : An investigation was made of the carbide-formation in Cr -- Ni steel (C -- 0.4, Cr -- 1.96 and Ni -- 2.75%) and in Cr -- Ni -- W (C -- 0.38, Cr -- 1.71, Ni -- 2.09, and W -- 1.51%) steel after hardening from 960° and tempering, as a function of the temperature (200 -- 650°) and of the length of soaking (up to 300 hours), using the differential carbide analysis method. A procedure for such a test is given. It is shown that the decomposition of martensite terminates in the above steels at 400 -- 500°. In this case the carbide portion of the steel, depending on the tempering condition, consists either of a single iron carbide or simultaneously of cementite and chromium carbide. Carbide of the cementite type is formed at a tempering temperature of 400° and less or in the beginning instants of deep tempering. No trigonal chromium carbide is formed 300 hours at 400°, but it appears

Card : 1/2

Category : USSR/Solid State Physics - Phase transformation of solid bodies

E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1226

after 50 hours at 500°, after one hour at 500°, and after five minutes at 560°. The amount of cementite increases at the start of the tempering, and diminishes upon the appearance of the chromium carbide (500 -- 550°). The maximum solubility of chromium in cementite reaches 20%, and that of tungsten reaches 2 -- 2.5%. Introducing tungsten into chrome-nickel steel reduces the amount of the special chromium carbide and reduces the solubility of the chromium in the cementite. A double carbide of iron and tungsten is formed by tempering at 600° (300 hours) and at 650° (50 hours).

Card : 2/2

Kishkin S.T.

✓ A study of the influence of high-melting elements on the autodiffusion of iron by using the radioactive isotopes. S. Z. Bokshtein, V. A. Kazakova, S. T. Kishkin, and L. M. Mirskii. *Izvest. Akad. Nauk S.S.R., Otdel. Tekh. Nauk* 1955, No. 12, 18-37. — The autodiffusion of Fe in Fe-Ni alloy (around 25% Ni) was studied after the addn. of a third alloying element (Mo, Nb, Ti, or V) by electroplating a 3-4 μ -thick layer of Fe⁵⁹ from a sulfate soln. upon an alloy plate 29 X 9 X 7 mm. in size, fastening 2 such plated strips with their active faces adjoining, enclosing them in quartz tubes, evacuating to a 10^{-4} mm. vacuum, and annealing at 1600, 1100, 1150, and 1206°. After each heat-treatment, thin layers were machined off along the active surfaces to a thickness controlled by sensitive micrometers and by microweighing. A low concn. of the third alloying elements was found sufficient to repress the iron polymorphic transformations: thus, with only 0.8% Ti only the α -Fe crystal lattice could be observed over the whole annealing temp. range. A table is given of the relation of the autodiffusion coeff. D and the concns. of the third element. Ni and V addns. lower the diffusional mobility of Fe and reduce the values of D and the autodiffusion energy. Mo, Nb, and Ti lower the Fe mobility, but raise the value of D and greatly increase the diffusion heat. It is concluded that the addn. of the last three alloying elements results in strengthening the at. bond energy, in accordance with the higher recrystn. temp. and the tensile strength of the alloys. W. M. S.

(3)

4
 The Homogeneity of Alloys and Mobility Along
 Grain Boundaries with the Aid of Radioactive Isotopes
 S. K. Kulkarni and J. W. Christian
 J. Appl. Phys. 41, 11, 4115 (1970)
 The autoradiographic method
 of study of the distribution of elements in
 solid and suitable methods are described
 The results obtained for carbon in cast steel (0.33% C), for tin in
 various elements in nickel are illustrated and
 discussed. During the study of the kinetics of element
 redistribution the possibility was noted of increased hetero-
 geneity as a result of diffusional annealing. The mobility of
 components was found to be considerably greater in deformed
 than in cast alloys. Diffusion inside a crystal and along grain
 boundaries can be studied photomicrographically. —S. K.

KAS

KISHKIN, S.T.

62 ✓ A quantitative investigation of the distribution of the elements in alloys. S. T. Kishkin, S. Z. Bokshtein, L. M. Moroz, and T. I. Gudkova. *Doklady Akad. Nauk S.S.S.R.* 101, 667-70 (1956).—The distribution was studied by autoradiography of alloys contg. radioactive isotopes. A 100x magnification of the autoradiograph gives a clear image of the distribution of the elements. A good agreement of the autoradiographs with the micrographic structure of the alloys is illustrated on an example of steel contg. 0.33% C. Large chem. nonhomogeneity was found within a single phase and within a single structure element of the alloys. Mo, Nb, Zr, and Sn are enriched in the boundary region of Ni and in the interdendritic spaces, while W is preferentially distributed along the dendritic axes. In Ni alloyed with Fe, the latter is found principally throughout the grain vol., while the boundaries are impoverished in it. S, P, Sb, etc., are arranged principally along the grain boundaries and in the interdendritic spaces. Nonhomogeneity is observed even in binary alloys, with a very small concn. of the added metal (below 0.01%). The nonuniformity cannot be explained by the surface tension phenomena. W. M. Sternberg

3

KISHKIN, S. T.

USSR/ Physics - Metal diffusion

Card 1/1 Pub. 22 - 18/49

Authors : Bokshteyn, S. Z.; Kishkin, S. T.; Moroz, L. M.; and Gudkova, T. I.

Title : Studying the internal and surface diffusion of metal granules by the auto-radio-graphic method

Periodical : Dok. AN SSSR 102/1, 73-76, May 1, 1955

Abstract : Experiments intended to establish a certain law of a metals' diffusion are described. Tin, iron and nickel were used in the experiments. The diffusion of tin molecules with surface and volume (internal) molecules of iron and nickel was determined by the auto-radio-graphic method. Results are presented. Eight references: 2 USA and 6 USSR (1931-1953). Graphs; illustrations.

Institution :

Presented by : Academician G. V. Kurdyumov, July 15, 1954

KISHKIN, S.T.; SULIMA, A.M.; STROGANOV, V.P.; MALYSHEV, M.V., redaktor;
BELITSKAYA, A.M.; izdatel'skiy redaktor; LEBEDEV, L.A., tekhn.
redaktor.

[Investigating the effect of cold working on the mechanical properties and the structure of EI437A alloy] Issledovanie vliyaniya naklepa na mekhanicheskie svoystva i strukturu splava EI437A.
Moskva, Gos.izd-vo obronnoi promyshlennosti, 1956. 85 p. (Moscow
Aviatsionnyi institut. Trudy, no.71) (MLRA 9:12)
(Nickel-chromium alloys--Cold working)
(Heat resistant alloys--Cold working)

Secondary hardness in steels alloyed with vanadium,

and M. Kybina. *Izv. Akad. Nauk SSSR*
Ser. Fiz.-Mat. Nauki, 1965, No. 1, p. 115.

an increase in the hardness of
the steel. Investigation revealed that the
figure (100)

KISHKIN; S.T.

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KISHKIN, S. T.

"Effect of Metal Composition and Structure on Grain Boundary Diffusion,"
S. Z. Bokshteyn, S. T. Kishkin, and L. M. Moroz, Moscow Aviation Inst, USSR.

Paper submitted for presentation at the International Conference on
Radioisotopes in Scientific Research, Paris, 9-20 Sep 1957.

KISHKIN, S.T.

137-58-5-10603

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 249 (USSR)

AUTHOR: Kishkin, S. T., Panasyuk, I. O.

TITLE: On the Brittleness of Chromium (O khrupkosti khroma)

PERIODICAL: V sb.: Issled. po zharoprochn. splavam. Vol 2. Moscow, AN SSSR, 1957, pp 135-140

ABSTRACT: Bibliographic entry. Ref. RzhMet, 1957, Nr 12, abstract 24997

1. Chromium--Mechanical properties

Card 1/1

129-2-1/10

KISHKIN, S.T.

AUTHOR: Bokshteyn, S.Z., Dr. of Technical Sciences Prof., Kishkin, S.T.,
Dr. of Technical Sciences Prof. and Moroz, L.M., Eng.

TITLE: Self-Diffusion of Iron in the Volume of the Grain and Along its
Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam
zerna).

PERIODICAL: Metallovedeniye i obrabotka metallov, 1957, No. 2, pp 2-10 (U.S.S.R.)

ABSTRACT: In a series of papers V.I. Arkharov et alii (14, 15) show, on the
basis of metallographic analysis, that there is preferential diffusion
of a number of elements along the grain boundaries of iron, nickel
and copper. Gruzin, P.L., Kuznetsov, E.V. and Kurdyumov, G.V.
(22) studied the diffusion of iron in the alloys iron-nickel and
iron-nickel-carbon (25% Ni, 0.69% C) and found that the straight
lines expressing the dependence $\lg D$ on $1/T$ show a break at 1000
to 1100°C. The inclination angle at lower temperatures indicates
lower values of the activation energy compared with respective high
temperature values; this dependence was observed only if the
alloy was subjected to martensite transformation prior to diffusion
annealing. In fact, the diffusion coefficient at 900°C in this
case is three times as large as for specimens which have not been
subjected to martensite transformation, i.e. 7.65×10^{-12} and 2.35×10^{-12}
 cm^2/sec respectively. Apparently, the influence of earlier transformations

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129-2-1/10

TITLE:

Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam zerna).

is nullified only after heating the specimens to 1000 to 1100 C. Earlier investigations by the authors of this paper (21, 23) by means of auto-radiography methods indicates that this process is nonuniform in a polycrystalline body and has a pronounced local character. The process of self-diffusion of iron was investigated by means of an auto-radiography method described earlier by the authors of this paper (21,23). 20 x 10 x 10 mm specimens of Armco iron (0.028% C, 0.030% S, 0.017% P, 0.12% Si, 0.22% Mn) were coated with radio-active Fe⁵⁹ in an electrolytic bath of such a composition that the coating can be effected at room temperature, is not liable to oxidation, is stable in operation and does not have to be frequently corrected. During 10 to 15 minutes an 0.2 to 0.5 μ thick radio-active iron layer was deposited with an activity of 4000 to 7000 imp/cm min. For self-diffusion of the iron in the α and the γ states annealing was effected in the temperature range 800 to 1200°C, maintaining the temperature constant within 2°C. At

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129-2-1/10

TITLE:

Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam zerna).

first the qualitative self-diffusion of iron was studied at 800, 1000, 1100 and 1200°C. Fig. 1 shows auto-radiograms of specimens after diffusion annealing at 800, 1000 and 1200°C. Fig. 2 shows the measured values of the depth of self-diffusion of iron in the grain for 1000°C. Fig. 3 shows the dependence of the density of blackening on the depth of self-diffusion of iron along the grain boundaries. Fig. 4 shows the temperature dependence of the self-diffusion coefficient of iron inside the grain and along the grain boundaries. Measured values of the influence of the temperature on the coefficient of self-diffusion inside the grain and along the grain boundaries are given in a table on p. 8. As a result of the tests, the character of the process of self-diffusion of iron in the α and the γ states was determined. It is shown that displacement of atoms during self-diffusion of the iron takes place predominantly along the grain boundaries within a wide range of temperatures (800 to 1200°C) and is independent on the type of crystal lattice. For the temperature dependence of the coefficient of self-diffusion of γ iron the relations were determined separately

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APPROVED FOR RELEASE: 09/17/2001

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129-2-1/10

TITLE:

Self-Diffusion of Iron in the Volume of the Grain and Along its Boundaries. (Samodiffuziya zheleza v ob'yeme i po granitsam zerna).

for the grain boundary and for the grain volume, namely:

$$D_{\text{boundary}} = 2.3 \times 10^{-30} \exp(600/RT)$$

$$D_{\text{grain}} = 0.16 \times 10^{-6} \exp(-64000/RT)$$

Although conserving a high mobility along the crystal boundaries in the case of self-diffusion right up to 1200°C, a decrease is observed in the speed of diffusion with increasing temperatures, namely:

$$D_{\text{boundary}}/D_{\text{grain}} \text{ (at } 1000^{\circ}\text{C)} = 12\,000$$

$$D_{\text{boundary}}/D_{\text{grain}} \text{ (at } 1200^{\circ}\text{C)} = 2\,500.$$

Card 4/5

Kishkin, S. T.

129-12-5/11

AUTHORS: Kishkin, S.T., Doctor of Technical Sciences, Prof.
and Klypin, A.A., Candidate of Technical Sciences.

TITLE: Mechanism of disruption of the alloy **3M437** under conditions of operation at elevated temperatures for long durations. (Mekhanizm razrusheniya splava EI437 v usloviyakh dlitel'noy raboty pri povyshennykh temperaturakh).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1957, No.12, pp. 36-40 (USSR)

ABSTRACT: Available data indicate that creep is accompanied by development of cracks (Refs.1-3). Crack formation due to reduced breaking strength is one of the types of exhaustion of the strength with the progress of time. The reduction of the breaking strength with time is associated with a change in the structure under the influence of temperature and creep along the grain boundaries. In this paper disruption of the alloy **3M437** at elevated temperatures is investigated and also the influence of forming cracks on the strength properties. Forged rods of the alloy were subjected to heat treatment and at a constant load the time taken to disrupt the

Card 1/3 specimen was determined. Tests with periodic heating

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Mechanism of disruption of the alloy ~~3M~~ 437 under conditions of operation at elevated temperatures for long durations.

and cooling were made by the same set-up, except that the furnace had a changed design inasmuch as it was possible to subject the loaded specimen to an air blast perpendicular to its axis. The hardness of the melt during isothermal annealing at 700°C for 100 hours increases intensively, as can be seen in Fig.1; no hardness increase was observed at 800°C. The increase in hardness indicates that the strength of the investigated alloy increases as a result of the formation of finer phases which block plastic deformation. The disruption at a constant load cannot be associated with coagulation and with dissolution of hardening phases, for a time interval of 100 hours. Metallographic investigation on specimens which permit observation of the changes in the structure during the tests have shown that, in the case of long duration stresses, fine cracks occur. During the remaining time until disruption, growth of the existing cracks and formation of new ones continues. Fig.2 shows the creep curve of a specimen tested at 800°C with a stress of 25 kg/mm². The graph, Fig.5, shows the

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129-12-5/11

Mechanism of disruption of the alloy Al437 under conditions of operation at elevated temperatures for long durations.

influence of preliminary loading on the short duration strength of the alloy at 800°C ; Fig.6 shows the influence of preliminary loading on the long duration strength at 800°C and a stress of 20 kg/mm^2 ; Fig.7 shows the influence of preliminary loading on the short duration strength of the alloy Al437 without removal and after removal of the surface layer at 800°C ; Fig.8 shows the influence of preliminary loading on the short duration strength of the alloy at 700°C . On the basis of the results, the author concludes that disruption of the alloy Al437 under conditions of long duration loading at elevated temperatures is due to the formation of cracks at the initial creep stage. Formation and development of cracks in this alloy at 700 and 800°C and long duration static loading takes place exclusively along the grain boundaries in a direction perpendicular to the acting forces, which proves that the breaking strength along the grain boundaries is low. Acceleration of the disruption in the case of repeated heating and cooling is associated with a more intensive formation of cracks. There are 8 figures and 5 references, 3 of which are Slavic.

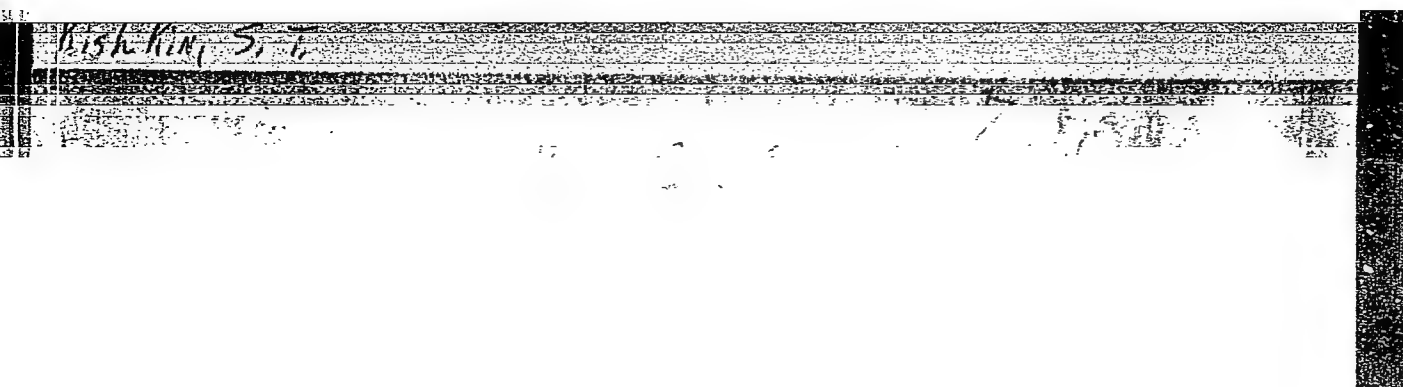
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CIA-RDP86-00513R000722820007-3"

AUTHORS:

Kishkin, S.T.
Gudkova, T.I., Gorbato, V.S., Bokshteyn, S.Z., 32-12-19/71
Zhuikovitskiy, A.A., Kishkin, S.T.

TITLE:

A Method of Investigating the Influence Exercised by Tension and Deformation Upon the Self-Diffusion of Iron (Metodika issledovaniya vliyaniya napryazheniya i deformatsii na samodiffuziyu zheleza).

PERIODICAL:

Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1438-1439 (USSR)

ABSTRACT:

In an Institute of the AN USSR, which is not mentioned here, a special device was constructed which makes it possible to carry out diffusion red hot heating in the vacuum, in which the diffusion properties of the samples can be investigated by making use of traction at the conditions of elastic and plastic deformation. The apparatus consists of a combination of the test-machine "B7-8", a steel vacuum camera having a diameter of 200 mm, and containing an electric furnace of 110 mm length and the necessary measuring devices. The flat samples of slightly carboniferous steel (0.1%C; 0.35%Mn; 0.024%P; 0.015%S) were subjected to traction in the machine up to the degree of extension and destruction. Because of the decrease of structural tensions the samples were previously softened in the vacuum at 1000°, after which they were on one side and on a surface of 1 cm² provided with a coating of electrolytic iron which served as diffusion

Card 1/2

A Method of Investigating the Influence Exercised by Tension
and Deformation Upon the Self-Diffusion of Iron

32-12-19/71

object. The results obtained are shown together in a table. It was found that the self-diffusion of iron under certain conditions develops mainly according to the structural grain boundaries, and that the circumstances of the application of fraction as well as of the high temperature accelerate the diffusion of iron. The plastic deformation of the sample increases the self-diffusion of iron by nearly the three-fold, which is explained by the atomic motion which sets in. At the same time, however, the activation energy in the corresponding domain of the sample is diminished. Iron with a 0.1%C-content enters into the two-phase state ($\alpha - \gamma$) at 750-800°, but because the α -phase remains predominant, it also determines the velocity of the diffusion current. There are 1 table and 9 Slavic references.

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Card 2/2

1. Iron-Self diffusion-Determination
2. Instrumentation
3. Iron-Tension
4. Iron-Deformation

KISHKIN, S. T.

Category: USSR / Physical Chemistry - Crystals

B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29696

Author : Kishkin S. T., Nikolenko V. V.

Inst : ~~Academy of Sciences~~ USSR

Title : Heat Resistance and Effect of the Medium

Orig Pub: Dokl. AN SSSR, 110, No 6, 1018-1021

Abstract: The effect of low-melting admixtures (Pb, Sn, Bi, Sb, etc), which are usually deposited along the grain boundaries and drastically decrease the heat resistance of alloys, is interpreted on the basis of notions, evolved by P. A. Rebinder, concerning the effect of surface-active substances on surface energy and the strength of polycrystalline solids and monocrystals.

Card : 1/1

-20-

20-6-21/59

AUTHOR
TITLE

KISHKIN, 3.T., PANASYUK, I.O.,
On the Brittleness of Chromium.
(O khrupkosti khroma - Russian)

PERIODICAL

Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 6, pp 1263-1264 (U.S.S.R.)

ABSTRACT

It is possible to understand the viscosity of chromium if one takes into consideration the scheme of the viscous and of the brittle fracture (as proposed by A.F. Ioffe) as well as the experimental data on chromium and its alloys. According to these concepts, the resistance to rupture must remain relatively constant in a rather large temperature interval and decrease only at sufficiently high temperatures. The experimental results obtained by the authors of the paper under review suggest that with increasing temperature the resistance to rupture of the polycrystalline commercial chromium increases but does not remain constant. Up to a certain temperature the elongation equals zero, but then the elongation increases and the brittle fracture goes over into a viscous fracture. But if the threshold value of the cold-shortness of chromium depends on the melting temperature, then the transition from the viscous to the brittle fracture should actually take place below the normal temperature. Also in the steels which are hardened on martensite the resistance to rupture increases if the annealing temperature is raised. It is probable that all elements which dissolve in the one or the other metal in accordance with the principle of penetration (similarly to carbon in iron) are in a position to strongly deform the crystal

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On basis of this fact, the following can be explained: Commercial chromium is not a pure metal but rather an alloy, with a crystal lattice, which is deformed in single parts of the grains. The elements which form solid penetration-solutions have a different influence on the plasticity of chromium. The paper under review discusses some details. Particular connection of the penetration of nitrogen, the heterogeneity of the solid solution and the difference in the phases of commercial chromium make it brittle. Nitrogen is one of the most harmful admixtures.
(1 reproduction).

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ASSOCIATION
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All-Soviet Scientific Research Institute for Aviation Materials
REBINDER P.A., Member of the Academy,
24.3.1956
Library of Congress

25(1)

PHASE I BOOK EXPLOITATION

SOV/1922

Kishkin, Sergey Timofeyevich

Vliyaniye oblucheniya na struktury i svoystva konstruktsionnykh metallov (Effect of Irradiation on Structure and Properties of Structural Metals) Moscow, Oborongiz, 1958. 39 p. Number of copies printed not given.

Ed.: M.S. Lagovskaya.

PURPOSE: This book may be used by students and Aspirants studying physical metallurgy as well as by scientific workers in the field.

COVERAGE: The book is based on a series of lectures read by the author at the Moscow Institute of Aviation imeni S. Ordzhonikidze. These lectures deal primarily with the effect of radiation on the properties and behavior of metals and alloys. The author discusses the changes in the atomic lattice of metals due to radiation and known as the Frenkel' defect. It is said that the strongest effect on the structural properties of metal is produced by neutrons, which, because they lack an electric charge, are capable of

Card 1/3

Effect of Irradiation on Structure (Cont.)

SOV/1922

penetrating the crystal lattice and causing various alterations therein. Other effects of radiation on certain ferrous and non-ferrous metals are listed and tabulated. In conclusion it is stated that the Frenkel' defect in the crystal lattice is responsible for the basic structural change in metals that determines their physical and mechanical properties. There are 24 references, of which 14 are Soviet, 9 English, and 1 Austrian. The only personality mentioned is Y.I. Frenkel, who developed the theory of structural changes in the crystal lattice due to radiation.

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Effect of Irradiation on Structure (Cont.)

SOV/1922

APPROVED FOR RELEASE: 09/17/2001

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AVAILABLE: Library of Congress

Card 3/3

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6-16-59

18(7)

AUTHORS:

Bokshteyn, S. Z., Zhukhovitskiy, A. A., SOV/163-58-4-26/47
Kishkin, S. T., Mal'tsev, E. R.

TITLE:

Influence of the Phase Conversion on the Speed of
Autodiffusion (Vliyaniye fazovykh prevrashcheniy na
skorost' samodiffuzii)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4,
pp 158-161 (USSR)

ABSTRACT:

The influence of eutectoid conversion in steel on the speed of autodiffusion in iron is explained. Besides, some experiments were made to measure the effect of polymorphic conversion $\alpha \rightleftharpoons \gamma$ on the speed of autodiffusion. The influence of eutectoid conversion (austenite-perlite) in steel U8 (0.78 % C) on the speed of autodiffusion in iron was investigated. For determining the diffusion parameters, the usual variant of the absorption method (Ref 2) was used. The diffusion factor was calculated according to the theory (Ref 3). It is shown that the eutectoid conversion increases considerably the average mobility of the atoms in the lattice. In examining the influence of the polymorphic $\alpha \rightleftharpoons \gamma$ -conversion on the autodiffusion of iron (0.059 % C), one of the variants

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Influence of the Phase Conversion on the Speed of
Autodiffusion

SOV/163-58-4-26/47

of the absorption method, the so-called "method of the thin layer" (quotation marks in the Russian original) (Ref 2) was used for determining the factors of autodiffusion in iron. The data obtained show that the autodiffusion of iron in cyclic annealing, when the $\alpha \rightleftharpoons \gamma$ -conversion is imposed on the diffusion process, proceeds at about the same speed as the autodiffusion of α -iron in isothermic annealing at 880°. Thus, the polymorphic conversion does not change the speed of autodiffusion, in contrast to the eutectoid conversion. The formation of the new phase and the corresponding lattice reconstruction may lead to an increase of mobility of the iron atoms on account of a number of causes mentioned here. The polymorphic $\alpha \rightleftharpoons \gamma$ -conversion has apparently no noticeable influence on the elementary act of autodiffusion of iron. Thus, the two processes may be regarded independent of each other. This result can be explained by supposing that - in the case of substituting a crystalline iron atom packing by another - the atoms do not shift by great distances but only by distances smaller than the interatomic distance. In contrast with the polymorphic conversion, the eutectoid conversion in

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Influence of the Phase Conversion on the Speed of
Autodiffusion

SOV/163-58-4-26/47

steel increases the speed of autodiffusion of the iron
considerably (by one order of magnitude). There are
1 figure, 2 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy institut stali i VIAM (Moscow Steel Institute
and VIAM)

SUBMITTED: May 22, 1958

Card 3/3

SOV-129-58-6-5/17

AUTHORS: Kishkin, S. T. (Dr. Tech. Sci. Prof.), Klypin, A. A. and
Sulima, A. M. (Cands. Tech. Sci.)

TITLE: Influence of the Plastic Deformation on the High Temperature
Strength of the Alloy EI437 (Vliyaniye plasticheskoy
deformatsii na zharoprochnost' splava EI437)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 6,
pp 18-21 (USSR)

ABSTRACT: The aim of the here-described work was to study the
properties of the alloy EI437 after preliminary plastic
deformation and to establish the mechanism of failure of
this alloy at 500, 700 and 800°C. The technique and the
results are described. The authors arrived at the follow-
ing conclusions: (1) The plastic deformation has an impor-
tant influence on the service life of dispersion hardened
high temperature alloys of the type EI437, reducing the
service life considerably at 700 to 800°C. (2) The influence
of plastic deformation is linked with an acceleration of
the diffusion processes which form the basis of dispersion
hardening and which lead to a decrease in the breaking
strength; at low temperatures when there is no appreciable
acceleration of the diffusion processes, the factor of
breaking up of the grains of the metal into blocks pre-

Card 1/2

18(7)
AUTHORS: Bokhshteyn, S. Z., Gudkova, T. I., Zhukhovitskiy, A. A.,
Kishkin, S. P.

TITLE: On the Influence of Irreducible Structure Modifications Which
Occur During a Plastic Deformation on the Diffusion Mobility
(O vliyaniy neobratimyykh strukturnykh izmeneniy, vznikayushchikh
pri plasticheskoy deformatsii, na diffuzionnyuyu podvizhnost')

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 6, pp 1015-1018
(USSR)

ABSTRACT: This paper investigates the influence of a previous plastic
deformation at a high temperature on the diffusion of zink
in nickel. This investigation is carried out separately for
the volume and for the boundaries of the grains. The previous
deformation of the plain samples were carried out by means of
expanding tensions $\sigma = 6 \text{ kg/mm}^2$ at a temperature of 700° in
the course of 5; 25; 50; and 60 hours. The diffusion currents
were determined by autoradiography of an oblique section. The
experimental results are given in a table and in a diagram.
According to these results, a previous deformation increases
considerably the velocity of the diffusion of tin in nickel

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SOV/20-121-6-17/45

On the Influence of Irreducible Structure Modifications Which Occur During
a Plastic Deformation on the Diffusion Mobility

(on the boundary and also in the volume). The volume modification is modified much more than the diffusion on the boundaries. For small deformations, the effect upon the boundaries and upon the grain has the same intensity. According to the analysis of the autoradiograms, the diffusion mainly takes place along the grain boundaries. The influence of the grain boundaries on the diffusion velocity decreases if the previous plastic deformation becomes more intensive. The above-given results may be explained by the following assumption: The plastic deformation at high temperatures causes essential modifications of the microstructure of the alloy. These modifications are irreversible or the initial state may be restored only by a heating of the samples to sufficiently high temperatures. According to an X-ray investigation, the above-discussed previous deformation at high temperatures noticeably diminishes the size of the blocks left after diffusion tempering. The results found for the diffusion of tin in nickel at 800° in the course of 100 hours are given in a table. The irreducible modifications of the structure exercise considerable influence on the diffusion mobility during

Card 2/3

SOV/20-121-6-17/45

On the Influence of Irreducible Structure Modifications Which Occur During
a Plastic Deformation on the Diffusion Mobility

the plastic deformation. A previous plastic deformation intensifies diffusion considerably. There are 3 figures, 2 tables, and 10 references, 6 of which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut aviatsionnykh materialov
(All-Union Scientific Research Institute of Aircraft Materials)

PRESENTED: April 19, 1958, by G. V. Kurdyumov, Academician

SUBMITTED: April 1, 1958

Card 3/3

KISHKIN, S. T.

PHASE I BOOK EXPLOITATION

SOV/3726

Bokshteyn, Samuil Zeylikovich, Sergey Timofeyevich Kishkin, and Lita Markovna Moroz

Issledovaniye stroyeniya metallov metodom radioaktivnykh izotopov (Study of the Structure of Metals by the Method of Radioactive Isotopes) Moscow, Oborongiz, 1959. 217 p. Errata slip inserted. 3,200 copies printed.

Reviewer: A.A. Zhukhovitskiy, Doctor of Chemistry, Professor; Ed.: A.G. Rakhshtadt, Candidate of Technical Sciences, Docent; Ed. of Publishing House: L.I. Sheynfayn; Tech. Ed.: V.P. Rozhin; Managing Ed.: A.I. Sokolov, Engineer.

PURPOSE: The book is intended for scientific workers and engineers specializing in metallurgy and the physics of metals.

COVERAGE: This book deals with the problem of the nonhomogeneity of metal alloys and the state of the metal at the interfaces, in particular at

Card 1/6

Study of the Structure (Cont.)

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the grain boundaries. The methods and results of investigations of the chemical nonhomogeneity of various alloys and of diffusion along the grain boundaries are presented. The authors devote considerable attention to methods and techniques of using tagged atoms in investigating distribution and diffusion processes. Engineer T.I. Gudkova participated in the experimental investigations of distribution processes of alloy components. The authors thank Professor A.A. Zhukhovitskiy, Doctor of Chemistry, and A.G. Rakhshtadt, Candidate of Technical Sciences. There are 47 references: 35 Soviet, 11 English, and 1 German.

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Ch. I. Nonhomogeneity of Metals and Alloys	7
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(9) 42

66-1606-2000
 2000 copies printed
 by the
 U.S. Government
 Printing Office
 Washington, D.C. 20540

PURPOSE: This book is intended for construction engineers, technologists and other persons interested in the strength of materials.

REFERENCE. This collection of articles was compiled by the Odesian State University Library with aid of ASSEN (Department of Physical and Mathematical Sciences) and the Physics-Mechanics Institute of AS SSR (Institute of Applied Physics, Academy of Sciences, USSR) in connection of the 50th birthday of Nikolay Khramovitch Baranov, Member of the Ukrainian Academy of Sciences and head of the local prominent Materials Department of the Scientific Center at the Institute of Applied Physics, Academy of Sciences, USSR. Founder of the Nukl. Inst. Fizicheskoy Metallologii (Department of Physical Metallurgy) at the Leningradskiy politehnicheskii Institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943) for the work "On the strength of materials, phenomena of imperfect elasticity, temper brittleness, and the strength of welded joints". The articles deal with problems of the mechanical properties of materials, phenomena of deformation speed, on the mechanical properties of crystalline, polycrystalline and general problems of the strength of plasticity, and mechanical properties of some metals. Numerous paradoxes are mentioned in the introductory profile of Professor Baranovskiy. References are given at the end of each article.

Stadis, I.A., B.G. Laryny, Ye.D. Starodubov, and V.I. Khotkevich (Vilno-technicheskii institut AN USSR-Institute of Applied Physics, Academy of Sciences (Ukr. SSR, Kiev)). Low-temperature Polymorphism of

Orlovskiy, G. S., and E. Ye. Tomashchuk (Institute of Applied Physics,
Academy of Sciences, USSR, Leningrad). Time Dependency of Strength
under Different Load Conditions

Blakemore, E. Z., T. L. Gudimov, A. A. Zhubovskiy, and B. V. Khabida.
Influence of Stresses and Deformation on the Process of Diffusion

lines, B. Ya., and A. P. Smirnova (Sverdlovskiy universitet imeni G. I. Usslova, Sverdlovsk State University imeni Gorky, Kharkov). Discussion Group of
 Interest Specimens Pressed from Powdered Iron

Putina, I. I., and N. A. Koryolov. *Institute of Metal Physics, USSR Academy of Sciences, Leningrad Branch, Ural Branch, Academy of Sciences, Sverdlovsk. Influence of Aluminum and Copper on the Deformation of Steel*.

NIKOLAEV, Z.A. (Institut popovodnikov AN SSSR, Leningrad-Demi-
shchikof Institute, Academy of Sciences, USSR, Leningrad). Relationship
between the Mechanical and Thermal Characteristics of Crystals

[illegible]

Yul'kov, M.O., and V.A. Rylov (Institute for Metal Physics, Ural Branch,
Academy of Sciences, Ural, Sverdlovsk). Some Aspects of Stress Relaxation
Brooks 54,2-1

Uphallie, B.O., and Z.A. Vashchenko (Polytechnic Institute Iosel M.I. Ulin, Leningrad). "Increasing the Elastic Limit and Decreasing the Aftereffect During Cold Hardening and Tempering of Spring Steels." *Metallurgiya* 1967

LEWIS, I. A., and R. H. KOLATA (Wipac Laboratories, c/o Polychrome Laboratories, Chicago, Ill., U. S. A.). *Leinograd-Scientific Research Institute for Petroleum Refining and Production of Synthetic Liquid Fuels*. (Unpublished). Abstract of the Physical Yield Point of Steel.

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BOKSHEYN, S.Z.; GUDKOVA, T.I.; ZHUKHOVITSKIY, A.A.; KISHKIN, S.T.

Effect of stress and deformation on diffusion processes.
Isul.po zharopr.splav. 4:158-164 '59. (MIRA 13:5)
(Diffusion) (Deformations(Mechanics))

SOV/129-59-5-3/17

AUTHORS: Dr. Tech. Sci. Prof. S.T. Kishkin; Cand. Tech. Sci.
A.A. Klypin

TITLE: Influence of Repeated Heating and Cooling on the Changes
in the Properties of Steels and Alloys (Vliyaniye
mnogokratnykh nagrevov i okhlazhdeniy na izmeneniye
svoystv staley i splavov)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov,
1959, Nr 5, pp 15-19 (USSR)

ABSTRACT: The aim of the work described in this paper was to study
the influence of cyclic heating and cooling on the
mechanical properties of certain steels and of the alloy
EI-437. The heating was effected by induction, using a
200 kc/sec current supplied from a 60 kW tube oscillator.
The specimen was cooled with water or with air, the feed
rate of which was controlled by two electric valves.
The circular specimens of 5 mm diameter, which were used
for short and long duration tests, were subjected to
heating and cooling according to a pre-determined regime.
Prior to the tests the specimens were heat treated so as
to exclude the influence of previous heat treatment. The
Card 1/3 specimens were heated on a 8 to 10 mm long section in the

SOV/129-59-5-3/17

Influence of Repeated Heating and Cooling on the Changes in the Properties of Steels and Alloys

middle and in this section the temperature was maintained practically equal at the various points of the surface. The heating temperature for the steels was 550, 700 and 780, 850°C; for the stainless steel IKh18N9T and for the alloy EI-437 the heating temperature was 800°C. The heating duration was 2 to 4 seconds. In Figs 1 to 4 the changes are graphed of the various mechanical properties of the tested steels and alloys as a function of the number of heating cycles. On the basis of the obtained results the following conclusions are arrived at:

- 1) As a result of cyclic heating above 780°C and cooling, the strength will decrease with increasing content of the carbon on the steel. This is attributed to a decrease in the tensile strength of the material with increasing carbon content.
- 2) The drop in strength and plasticity with increasing number of heating cycles of all the materials investigated in these experiments is attributed to the formation of microcracks at the surface of the specimens.
- 3) Appearance of microcracks during heating below the critical range is associated with thermal

Card 2/3

Influence of Repeated Heating and Cooling on the Changes in the
Properties of Steels and Alloys

SOV/129-59-5-3/17

stresses occurring during rapid cooling. An increase in the cycle temperature and also in the cooling speed leads to a more intensive development of cracks. 4) In the alloy EI-437 the cracks were exclusively along the grain boundaries. In other investigated materials the cracks were detected along the boundaries as well as along the body of the grain.

Card 3/3 There are 5 figures and 5 references, 4 of which are Soviet and 1 German.

KISHKIN, S. T.

The first prize of 10,000 roubles (imeni D. K. Chernov) was awarded to the following team: Professor S. Z. Bokshteyn, Engineer T. I. Gudkova, Doctor of Technical Sciences Professor A. A. Zhukhovitskiy, Doctor of Technical Sciences Professor S. T. Kishkin and Engineer L. M. Moroz for the paper "Investigation of the diffusion and the distribution of components in a real metal by means of radioactive tracers". The work described in this paper represents experimental and theoretical work of fundamental importance on diffusion in alloys as a function of the structure of the metal and the stress field caused by external action. A brief summary is given of this paper and it is stated that it is not only of major theoretical importance but also of practical interest, particularly from the point of view of the problem of hightemperature strength.

Results of the 1958 Competition for Obtaining imeni D. K. Chernov and imeni N. A. Minkevich Prizes, *Metallovedeniye i termicheskaya obrabotka metallov*, 1959, No. 6, pp 62-64

KISHKIN, S.I.

PHASE I BOOK EXPLOITATION

507/362

Academy nauk SSSR. Institut metallurgii.

Issledovaniye splavov tsvetnykh metallov: sbornik 2 (Analysis of Nonferrous Metal Alloys: Collection of Articles, No. 2). Moscow, Izd-vo AN SSSR, 1960. 202 p. Errata slip inserted. 2,800 copies printed.

Ed.: I.A. Gding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Kuznetsov, Tech. Sci. Prof., Editor of Technical Sciences (Copy Ed.), Editor V.V. Zakharenko, Professor, Doctor of Technical Sciences; Ed.: E.S. Zakharenko, Candidate of Technical Sciences (Resp. Secretary); A.M. Korol'tsov, Doctor of Technical Sciences; N.Y. Kal'tsov, Professor, Doctor of Technical Sciences; and Z.A. Sviderskiy, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for workers in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

CONTENT: This is the second volume in a series of volumes on nonferrous and alloyed metals published by the Institut metallurgii (Inst. A.I. Baykova AN SSSR). Institute of Metallurgy, Inst. A.I. Baykov of the Academy of Sciences (USSR). and the Moskovskiy Institut tsvetnykh metallov i splavov (Inst. M.I. Malitskaya (Moscow Institute of Nonferrous Metals and Alloyed Metals M.I. Malitskaya). Less discussed concern the casting and physical metallurgy of nonferrous alloys. The effect of alloying and deformation on the properties of various alloys, and the problems connected with the study of the casting properties and with the plotting of phase diagrams for nonferrous alloys are discussed. 47 personalities are mentioned. References accompany most of the articles.

Kishkin, S.I., and G.P. Baidukova. The Behavior of Alloys in Contact with Molten Metals. 19

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18.1285

AUTHORS:

69386
S/129/60/000/06/005/022
E073/E535
Bokshteyn, S.Z., Kishkin, S.T., Doctors of Technical
Sciences and Osvenskiy, V.B., Engineer

TITLE:

Influence of Polymorphous Transformations on Diffusion
in Titanium

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
1960, Nr 6, pp 21-26 (USSR)

ABSTRACT: The operating temperature of titanium alloys is usually 450 to 500°C which is not in accordance with the high melting point of the titanium. It can be assumed that the low heat resistance of titanium alloys is due to a certain extent to diffusion processes. According to A. D. McQuillan (Ref 5) the temperature of polymorphous transformation for pure iodide titanium is 882.5°C. At the operating temperatures the α-modification is stable, whilst at the high melting temperature the β-modification is stable. For the purpose of investigating the influence of the allotropic modification of titanium on the diffusion, the authors used iodide titanium of the following composition: 0.015% Mg, 0.01% Si, 0.02% Fe, X

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< 0.02% Al, < 0.02% Ni, 0.008% Cr, < 0.005% Mn, 0.05% C, 0.05% O, 0.025% N. Since it is known that even small quantities of admixtures exert a considerable influence on the temperature of polymorphous transformations and the properties of titanium, the authors also investigated the commercial titanium VT1D of the following composition: 0.3% Fe, 0.15% Si, 0.10% C, 0.05% W, 0.04% N, 0.15% O, 0.015% H. The commercial titanium was produced in a vacuum arc furnace with a consumable electrode with double re-smelting in a step-wise crystallizer. The electrode was made of pressed titanium sponge. The produced ingots were forged into 12 x 12 mm cross-section rods. After descaling these were vacuum annealed at 1300°C for 8.5 hours. The diffusion of lead into the titanium was studied by means of labelled atoms. The diffusion was studied in the temperature range 700 to 1100°C, measuring every 20 hours the integral intensity of the β -radiation. Table 1 gives the obtained coefficients of diffusion of lead into iodide titanium at the

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temperatures 700 to 1100°C, whilst Table 2 gives the diffusion coefficients of lead in commercial titanium at the same temperatures. Fig 2 shows the distribution of lead in titanium resulting from diffusion into commercial titanium at 850°C. The authors also investigated the influence of structural transformations during diffusion annealing on the diffusion speed using two batches, one of which was quenched from 1050°C, the other was quenched (after soaking for 100 hours) from 750°C. The respective microstructures are reproduced in Figs 3a and b. The obtained results permit elucidating the apparent contradiction between the high diffusion temperature and low heat resistance of titanium. The low temperature modification of titanium has a high diffusion mobility; the low strength of the interatomic bonds, combined with the high diffusion mobility, leads to a rapid loss of the strength with increasing temperature. However, the high temperature

Card 3/4 modification of titanium appears to possess a relatively